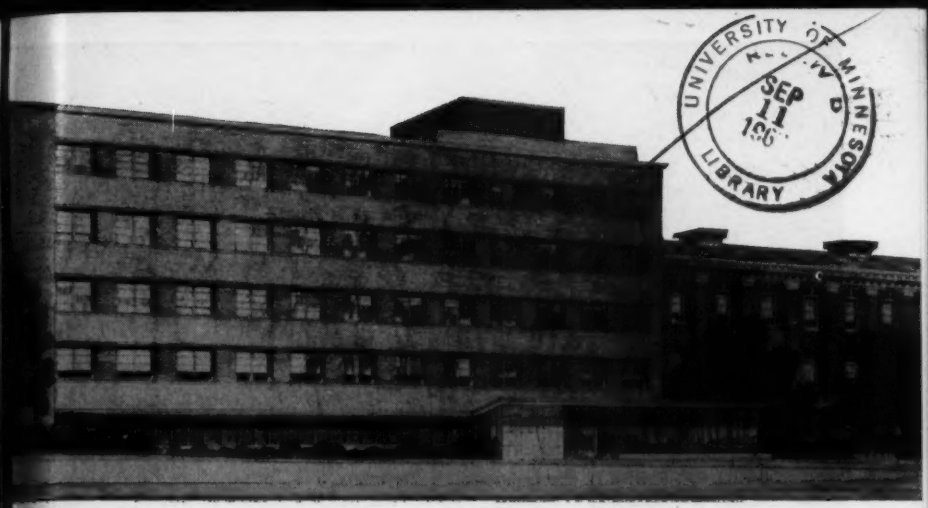

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Clinical Proceedings

OF THE CHILDREN'S HOSPITAL

WASHINGTON, D. C.

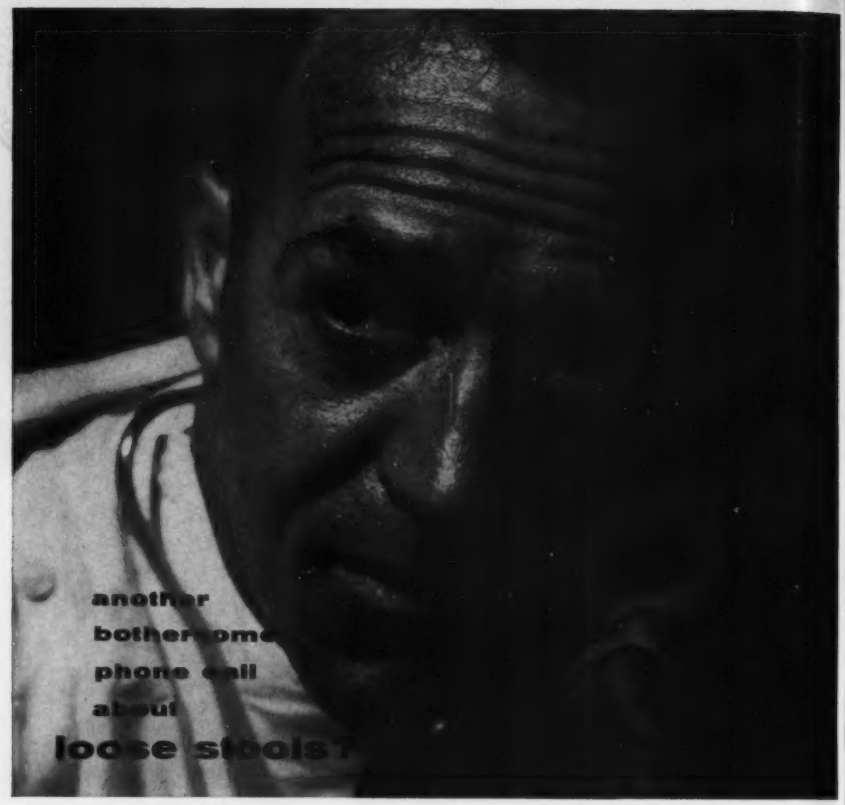
THE ROLE OF THE PEDIATRICIAN IN EARLY MOTHER-CHILD RELATIONSHIPS.
Julius B. Richmond, M.D. 101

VISUAL PROBLEM IN THE PRESCHOOL CHILD.
Nicholas G. Pistolas, M.D. 117

PORTOGRAPHY: A PRELIMINARY REPORT OF A NEW TECHNIQUE VIA THE UMBILICAL VEIN.
Octavio Gonzalez Carbalhaes, M.D. 120

CLINICAL BRIEF: CONGENITAL URETHRAL VALVES.
Byron D. Roseman, M.D. 123

THE EDITOR'S COLUMN: OPHTHALMOLOGICAL SUSPICION OF UNRECOGNIZED CONGENITAL TOXOPLASMOSIS 125



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Incidence of Loose Stools Negligible[2] 190 Hospitalized Infants

Age	No. Cases	Loose Stools†
Birth	14	0
1 mo.	36	0
2 mo.	27	1
3 mo.	12	1
4 mo.	10	1
5 mo.	14	0
6 mo.	8	0
7 mo.	19	0
8 mo.	11	0
9 mo.	10	0
10 mo.	8	0
11 mo.	11	0
12 mo.	10	0
	190	3 (1.6%)

†Exclusive of infants admitted with infectious diarrhea.

1. Frost, L. H., and Jackson, R.L.: J. Pediat. 39: 585-592 (Nov.) 1951.
2. Henrickson, W. E.: GP 8:51-56 (Oct.) 1953.

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The Role of the Pediatrician in Early Mother-Child Relationships*

JULIUS B. RICHMOND, M.D.†

I am pleased to have the opportunity to discuss with you a subject which has been of considerable interest to us for a number of years—the role of the pediatrician in early mother-child relationships. I must at the same time express some diffidence about discussing this subject in this setting, for perhaps nowhere else is the matter of early mother-child relationships undergoing the comprehensive study now current at the Child Development Laboratory of the National Institute of Mental Health and the Child Psychiatry Division of your own Children's Hospital under the direction of Dr. Lourie. One cannot become interested in this field without encountering Dr. Lourie's contributions, as will be mentioned later. To discuss this subject at Children's Hospital is indeed carrying coals to Newcastle.

Since this presentation is to be followed by a panel discussion‡ which will provide an opportunity for elaboration, I will take the liberty of presenting an overview of our research program and of our clinical experiences. I trust that it will be possible to extend this discussion by questions during the panel presentations.

The pediatrician's role in guiding early mother-child relationships is complex. This complexity is born of multiple responsibilities. Central among these—as a clinician—is the need to provide service to the community. Thus, in the face of relatively limited knowledge concerning the impact of early life experiences on later personality development, the pediatrician must, in operational terms, provide help to families endeavoring to rear their infants and young children most effectively. The charge to pediatricians, as well as others in the child-care professions, was embodied in the focus of the Midcentury White House Conference on Children and Youth, which was to consider the development of "... those mental, emotional, and spiritual values which are essential to individual happiness and responsible citizenship and what physical, social, and economic conditions are deemed necessary to such development." Although our scientific knowledge of how to foster such development is very primitive, we cannot, as

* The Joseph S. Wall Memorial Lecture, presented as part of the Children's Hospital of D. C., Alumni Day, May 24, 1958.

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‡ To be published in the June 1959 issue of Clinical Proceedings of the Children's Hospital.

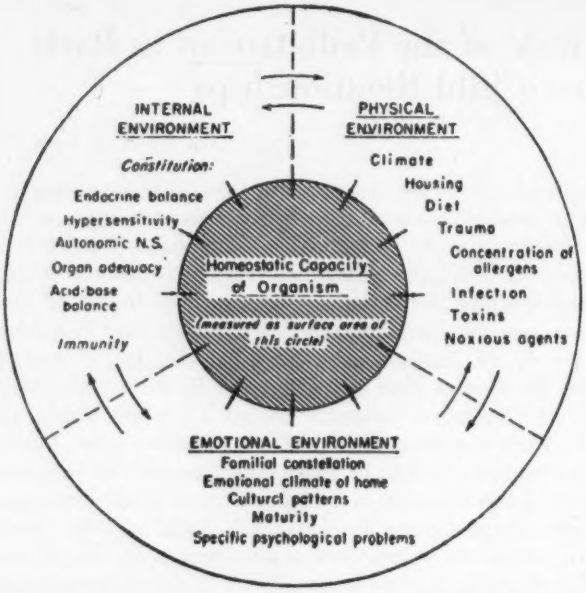

FIG. 1. A schematic representation of the pediatrician's consideration of the multiplicity of factors involved in the management of the patient.

clinicians, avoid our responsibility to families seeking our help. Although all is not known, we have developed a body of practice which seems effective operationally. As physicians we need make no apology, for medicine has grown out of empirically derived practices.

The pediatrician's role is unique in that he combines a background of knowledge in the biology of the child along with a concern about social and psychologic development. The interplay of these factors in modifying the adaptive or homeostatic capacity of the child is illustrated in figure 1. As pediatricians we are concerned with the constitutional or biologic problems along with the physical and psychological environments of the child and their interrelationships. We have found this visualization helpful because it enables us to describe homeostatic capacity in fluid, everchanging, and somewhat quantitative terms as may be seen in figure 2 which represents a child with bronchial asthma at varying stages of adaptation.[1]

I dwell on the pediatrician's clinical responsibility in contrast to his responsibility for the acquisition of new knowledge concerning early mother-child relationships, for I believe his preoccupation with clinical service has tended to interfere with his development of scientific studies of this age

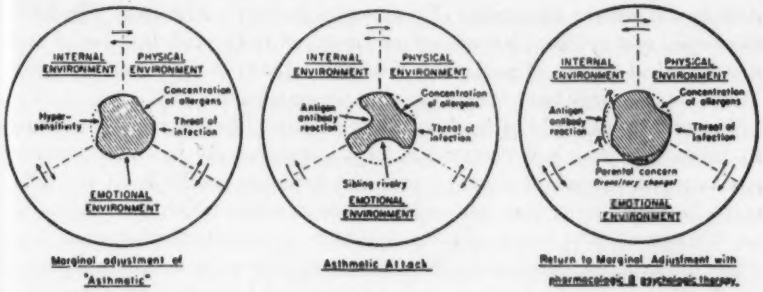

FIG. 2. A specific example of the application of the conceptualization presented in figure 1. Note the amoeboid, changing pattern of the patient's homeostatic capacity. This scheme permits representation of the patient's status in dynamic changing terms from time to time. This representation, of course, reflects the background of the physician.

period. As a result, pediatricians have drawn on the theoretical and investigative contributions of people in related fields. I refer specifically to the contributions of psychoanalysts, child psychologists, cultural anthropologists, and social workers. To these workers we must express our appreciation; we should, however, assume our share of the obligation to develop contributions which will extend our knowledge and ultimately increase the meaning of our clinical practice.

It may very well be that some distance from the practice setting has provided observers in related disciplines with more objectivity and perspective concerning early mother-infant relationships. This would be somewhat analogous to the observation that the best study of American government was made by an Englishman, Lord Bryce; distance from the immediate situation can have a salutary effect on objective study. I can't help but insert an editorial note at this point however. The pediatrician is in a uniquely favorable position to conduct research on mother-infant interaction, since parents bring infants and children to him over a period of time. He has the opportunity therefore to observe the development of relationships. He has the opportunity to synthesize his background in biology with relevant orientation from child psychiatry and psychology, psychoanalysis and social sciences. Also he is the one professional person who has the opportunity to see the child during sickness and health. The richness of his background and opportunity should in the future place the pediatrician in the forefront of research in child development in a manner analogous to his research interest and contributions to the biochemistry of diseases, metabolism, endocrinology, and microbiology. Indeed it is my hope that the next

decade will see the emergence of a group of pediatric educators who have developed competence in teaching and research in the cultural, social and psychological aspects of pediatrics. With the support of the Commonwealth Fund, we currently have such a training program under way.

Research in the field of mother-infant relationships has not yet reached its infancy; rather it is embryonic. This is due largely to the difficulties associated with such studies. In part this problem results from the difficulty that the infant does not communicate in terms which are familiar to us. This problem is not unique to the study of infant development. The study of psychotic patients is difficult because they cannot communicate to us clearly what is transpiring. Some theoretical formulations concerning infant development have resulted from retrospective speculations derived from the study of psychopathology in older children and adults. Thus Benedek, as a psychoanalyst who has developed a concept of "mother-infant symbiosis", has stated, "it takes several weeks of postnatal development until, through the rhythmic repetition of need and its gratification, the infant develops the perception that the source of his need (hunger, pain, discomfort) is within and the source of gratification is outside the self; i.e., separation in the psychological sense begins to exist for the infant."[2] Although this is a statement of early infant development in general terms it does not provide us with a more definitive understanding of how daily experiences influence the infant and his patterns of response.

In more recent years, psychoanalysts, particularly John Bowlby, have become interested in an ethological approach to the explanation of infant development in response to maternal care.[3] This approach of course emphasizes the inherent (or genetic) potentialities of an organism to respond to stimuli (or lack thereof) in a unique, species specific fashion. Many psychologists have been more interested in the learning process by which the daily experiences of the infant become the building blocks for more complex behavior.

Because of our biological background as pediatricians it is perhaps more appropriate for us to think of the evolution of behavior in the human infant in terms of his unique central nervous system. If we regard the human infant as having been born with a complex but immature central nervous system with certain potentialities for growth, the stimuli which foster such growth and the development of more complex behavior are of interest to us in terms of the neurophysiologic process associated with growth and behavior. It is desirable at this point for research to develop in the light of the unique background of each discipline, rather than to hope for homogeneity in theoretical or methodologic approach. Thus, although we may lean in one direction or another, it is well for us to draw upon theory and methodology from all orientations.

Since growth is expressed in terms of rate, and rate is a function of time, it is important to emphasize the timing of stimuli in the experience of the infant. In the study of human mother-infant interaction, therefore, we must constantly keep in mind not only the quality and quantity of experience, but the timing of these as well. We will have occasion later to illustrate the significance of timing in relationship to clinical disorders in infants. Benedek has succinctly indicated the significance of these relationships in her statement that "growth, neurophysiologic maturation and psychosexual development are intrinsically interwoven processes."[2] It is perhaps in the understanding of these interrelationships that the pediatrician is in a position to make his greatest contributions.

It is significant in gaining an appreciation of the adaptation of the infant to the world about him to note the rapid development of his central nervous system. Although he is born with a larger brain than most other adult primates, the brain of the human infant is nonetheless quite immature. Its average weight of 325 Gm. at birth is nearly the same as that of the adult chimpanzee, slightly less than the adult gorilla and somewhat more than the orangutan. Within two years the brain nearly trebles in weight and by six years has attained 95 per cent of mature weight.

During this period of rapid growth significant histological changes are taking place. The careful studies of Conel[4] indicate that central nervous system neurones continue to elaborate dendritic projections throughout the early months of life. Since the concept that neurones are connected in a network, not merely in linear series, and that nerve impulses passing about the connections in a circular, more or less continuing fashion to establish reverberating circuits is now well accepted, the development of this network may be appreciated.[5] Unfortunately, we know relatively little about how experiences become recorded as memories in this system; ultimate understanding of development will depend upon the increase in our knowledge of neurophysiology during these early weeks and months of life. Certainly the delicate appearance of this network emphasizes the importance of protecting the central nervous system from any insult during this period of rapid growth and development—a matter of considerable concern to the practicing pediatrician on many occasions.

We have little knowledge concerning the influence of experience or function on structure. From Langworthy's experiments with kittens it was observed that the optic nerve of a blindfolded kitten did not myelinize as well as that of the seeing eye.[6] The significance of this observation, however, is not very clear. In similar fashion Clark demonstrated a failure of development or cell atrophy of the "a" cell retinal layer in monkeys raised from birth in an environment of exclusively red light.[7]

In order to gain an understanding of the relationships between the cere-

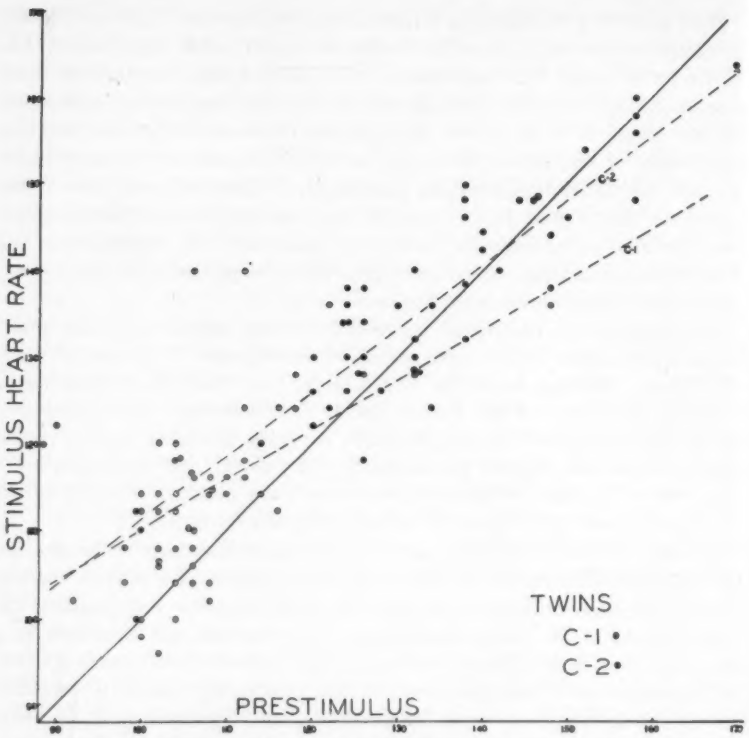

FIG. 3. Heart-rate responses of nonidentical twins to a standardized stimulus of an air current over the abdomen. The solid line would represent no change in response to the stimulus. Note differences in the two infants. Note also the greater responsiveness at the low prestimulus levels.

bral cortex and bodily function it is desirable to have some understanding of the relationship of the autonomic nervous system to cortical processes. Because of our interest in the development of so-called psychosomatic disorders in older children,[8] we became concerned about the predisposition of individuals to autonomic dysfunction under conditions of stress. We have need for a better understanding of organ specificity in these disorders. This has led us to a study of patterns of autonomic reactivity in newborn infants. It was hoped that we might shed some light on the problem of constitutional differences in autonomic function. These studies have led us into many methodologic problems—the most serious of which has been the wide variation in spontaneous autonomic activity in young infants. In our at-

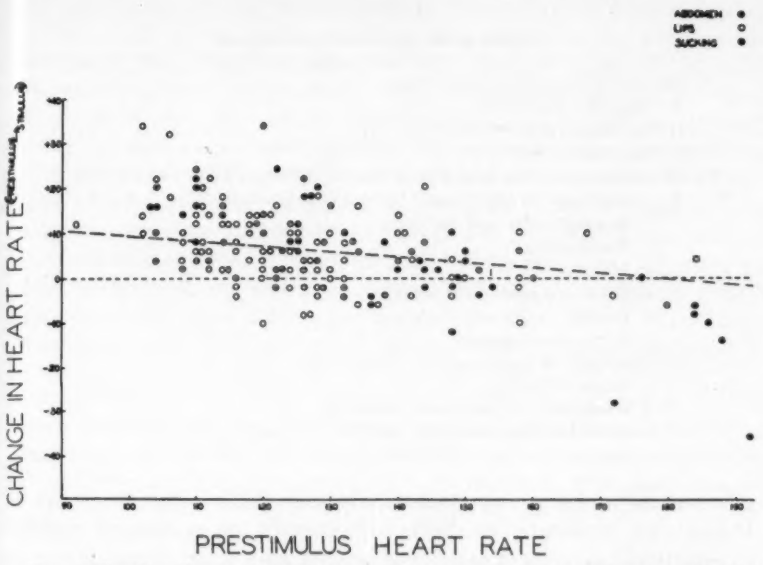

FIG. 4. Further illustration of greater heart-rate responses at low prestimulus levels. The pattern is similar even when different stimuli are employed (stroking of abdomen and lips and sucking).

tempts to determine the reactions of newborn infants to stimuli commonly encountered, we have found it difficult to compare responses because of the considerable variation in base line activity.

In figure 3 we can observe the considerable differences in heart rate between nonidentical twins. Along with the differences between these two infants we may note the spontaneous variations in heart rate for each infant observed at various times. In order to evaluate these data it has become necessary for us to employ an analytic method suggested by Wilder[9] as the "Law of Initial Values" and more recently developed by Lacey.[10] In effect this technique indicates that there is an inverse correlation in the degree of response to a given stimulus when related to the base line heart rate as the stimulus is applied. Thus an infant stimulated at a moment when the heart rate is high will manifest little increase in rate and indeed in some instances may experience a decline in rate, whereas his response to the same stimulus at a lower base line rate might have resulted in a considerable increase (fig. 4).[11] With this approach we believe it will now be possible to analyze children's patterns of autonomic activity over a period of time. It will perhaps also be possible to observe developing cortico-autonomic

TABLE I

Psychological Disturbances in Infancy

I. Effects of Maternal Deprivation
  A. Anaclitic depression
  B. Environmental retardation
  C. Spasmus nutans
II. Disorders Resulting from Disturbances in Parent-Infant Relationships
  A. Disturbance in physiologic function (psychosomatic)
    1. Regurgitation and vomiting
    2. Rumination
    3. Diarrhea
    4. Colic or fussiness in infants
    5. Eczema
    6. Nutritional anemia
  B. Disorders of body motility and rhythm
    1. Finger sucking
    2. Resistance to sleep and separation
    3. Head banging, excessive masturbation and autistic traits

relationships as Lacey and Darrow have been doing with older subjects. It may also be possible to study more directly the problem of whether constitutional patterns of autonomic activity have a significant impact on emotional development and conversely the influence of early experiences on patterns of autonomic response. This is one of our long-range objectives in observing these patterns over a period of time.

Perhaps of more immediate interest to the pediatrician are clinical observations which illustrate the relationship between early experience and physiologic function. It might be well to consider some of the disorders of infants which result from social and psychological difficulties. Since the publication of Bowlby's WHO monograph, "Maternal Care and Mental Health,"[12] there has developed a considerable interest in the effects of maternal deprivation on infant and child development. We might appropriately begin our clinical considerations with problems of separation of the infant from his mother. In table I is a rather arbitrary classification of these disorders.

Maternal Deprivation

A. Anaclitic depression. Although this is not an entirely satisfactory term, it has become established in the literature. Because of the long-term effects of institutionalization on intellectual and personality development as observed by Goldfarb and others, we have been interested to observe the long-term development of a child who has experienced severe deprivation. We have had the opportunity for a follow-up study of a marasmic infant

we had occasion to observe five years ago. The infant was admitted to our service at 13 months of age weighing 10 pounds. She had been studied extensively for congenital anomalies and metabolic disorders elsewhere. We were immediately impressed by the anxious and withdrawn appearance of the child when the crib was approached by any member of the staff, which led us to suspect that the child had undergone some significant separating experience. The history was then obtained that the mother (mentally retarded as a result of meningitis in childhood) had assumed employment as a domestic worker when the child was 8 months of age. Also she was told that she would "spoil" the child if she picked her up when she cried. Thereafter, she had little contact with the child, and provided a minimum of physical care. In the hospital the child gained 13 pounds in weight and improved remarkably in appearance over the next three months under the care of one nurse serving as a mother substitute.

Following discharge from the hospital the child was placed in a foster home where she has remained. We have had the opportunity to observe her from time to time. Her intellectual development reached normal limits by three years, and has continued to develop normally. Her personal-social behavior, however, is characterized by many of the signs noted by Goldfarb in institution-reared children.

The child is restless, hyperactive and unable to concentrate. Although her kindergarten teacher considers her bright and attractive, her inability to join with a group of other children in a single project prevents her from meeting the demands of the more orderly first grade school work.

She craves constant assurances of affection, is very fearful of short-term separation from her foster mother, and yet is highly independent, aggressive and resistant to adults and to children. She shows no guilt upon breaking rules, but becomes deeply upset and depressed when punished.

Thus, she shows relatively normal intellectual growth (unlike Goldfarb's cases), but her personality suggests a development similar to Goldfarb's institutionalized children and to Bowlby's "affectionless character." Further follow-up observations are planned in order to observe whether the personality characteristics noted may be further influenced by good foster home placement.

Engel, Reichsman, and Segal,[13] in their now classic study of an infant manifesting a "depression-withdrawal" reaction were able to study gastric secretion and emotional state, since the infant had a gastric fistula established for the management of an esophageal atresia. They demonstrated that during depression-withdrawal reactions there was a marked decrease or cessation of hydrochloric acid secretion. Outgoing affective states conversely were associated with rising rates of hydrochloric acid secretion. This study illustrates beautifully the relationship between psychologic and

physiologic processes. The route by which the physiologic change occurs is obscure. Indeed, this has led Engel[14] to state that "the inescapable fact is that there is as yet no physiology of the mother-infant symbiotic unit, or of object relationship. Nothing is known of the physiology of separation, grief and depression; other than embryology there is no real comparative physiology of growth and development; the physiology of moods and affects is incomplete; there is no physiology of love and only meager knowledge of sexual processes, erotic phenomena, and sexuality. Yet there is much evidence that such processes are concerned in intimate, but obscure ways with the development of a wide variety of somatic changes."

B. Environmental retardation. The infants previously described have, of course, experienced relatively severe separation and deprivation. The impact of less severe deprivation and its effect on later social and emotional responsiveness merits further study. Dr. Rheingold, in her study of institutionalized infants, noted that one mother substitute rather than multiple mothers had the effect of increasing the social responsiveness of a group of infants.[15] Studies of babies living in a variety of circumstances, such as adoptive homes, foster homes, as well as institutions, as a consequence of family disorganization are very much needed. Indeed, we must keep in mind that infants living in their families may be experiencing considerable deprivation, as was noted recently by Coleman and Provence in their report on environmental retardation.[16] The implication of these observations for social agencies engaged in adoption practice and foster home placement is obvious; it is important to emphasize, however, that changes in established practices should not be based on fragmentary data or inferences from research which are not justified.

For a more experimental approach to the impact of separation in early life, animal investigations are necessary. In recent studies, the effects of "handling" or "gentling" of young rats has been found to increase the rate of learning and growth. While at first this was thought to be due to the "gentling" *per se*, more recent studies by Levine[17] indicate that it is the "stress" of "handling" which seems to enhance learning. Thus it may not be the positive effects of the handling, but rather the stress—as measured by adrenal activity—associated with it which is the significant factor.

Certainly the human mother's reactions to minor degrees of separation is variable. Even the desire to have, or not to have, rooming-in varies greatly. To study the variable and subtle effects of transient separation of mother and infant, we have turned to a domestic goat population. Dr. Howard Liddell, Director of the Cornell Behavior Laboratory, has made it possible for Dr. Leonard Hersher of our department and Dr. Ulric Moore of the laboratory to undertake this study. Dr. Helen Blauvelt had previously studied the effects of neonatal separation in this setting.[18]

Twenty-four domestic goat mothers were separated from their newborn kids for periods ranging from one-half hour to two hours immediately following birth. A control group of 21 mothers equated for age and parity were permitted to follow the normal care-taking pattern. The usual life of the flock was not interfered with further until approximately at two months and again at three months after birth, when mother-kid interaction was studied in the following manner:

All the kids in the flock were housed in a room apart from all the adult goats for from 6 to 10 hours. The kids were deprived of both food and water during this time; the mothers received food and water as usual. Three of the kids, approximately the same age, were then brought into a room some distance from the remainder of the flock. One minute later the mother of one of the three kids joined them, and all four were observed for 15 minutes through a one-way vision glass. An observer recorded the time in seconds of the mother's nursing and butting behavior by activating separate electric clocks for the duration of each type of behavior as it occurred.

The three kids appeared highly excited and fearful when they were first brought into the unfamiliar room. With the appearance of the mother all three kids rushed toward her and attempted to nurse. The immediate reaction of all the mothers was to back or walk away from this onslaught for the first 30 seconds. After this initial period, most nonseparated (control) mothers began the process of establishing a private territory for herself and her own offspring by butting away the two other kids each time they approached her. After several minutes of this the other kids kept their distances while the mother nursed her own kid in the usual manner. In contrast, the separated (experimental) mothers behaved in a distinctly abnormal manner, nursing their own kids less than the nonseparated mothers and nursing other kids more. Separated mothers nursed other kids as long as they nursed their own, whereas nonseparated mothers nursed other kids relatively little, compared to the time spent nursing their own.

The group analysis, however, fails to demonstrate the patterns of mother-young interaction that appeared when the behavior of individual mothers was examined. This individual analysis demonstrated that three distinct types of maternal-young relationships could be distinguished, and that between the separated and nonseparated mothers the distribution of these three types of patterns was not random.

None of the separated mothers accepted their own kids in the normal manner. Half of this group nursed no young—neither their own nor others—during the observational periods (the "rejecting" pattern), and the other half nursed kids indiscriminately, suckling other kids as long or longer than their own (the "indiscriminate" pattern). The majority of the nonseparated group exhibited normal nursing behavior—nursing their own

kids but not others. None of the nonseparated mothers nursed indiscriminately although one-third were "rejecting".

The effect of early separation on maternal care thus varies among individuals, some mothers reacting to separation by rejecting all kids, and other mothers reacting by exhibiting highly maternal, though nonindividual-specific, behavior. Thus, the immediate postpartum period is critical to the development of maternal behavior in goats, but the behavior which normally develops during that crucial time consists of at least two factors—maternalism and individual care—and the former may develop in the absence of the latter.

Later experimental study of the mother's behavior when her kid was tied to a wall of the observation room reveals that the maternal behavior of the "indiscriminate" mothers was not mere passive acceptance. "Indiscriminate" mothers stood near the kids as long as normal mothers, and exhibited an equal degree of agitated pacing behavior while their kids were in this stressful situation. The considerable amount of bleating of the "indiscriminate" mothers, in fact, suggests a high degree of maternal responsiveness. Analysis of other factors underlying the development of "indiscriminate" mothering behavior awaits further experiment. In this study neither age, length of separation, nor experience in mothering (parity) distinguished the "indiscriminate" from the "rejecting" mother.

An unexpected result of the present study was the appearance of "rejecting" behavior among the mothers of the nonseparated group. Analysis of the postpartum behavior of another herd, in which none of the goats had been separated at birth, revealed no instances of "rejecting" or "indiscriminate" behavior, suggesting that the act of separating half the mothers in the experimental herd had probably been the principal factor affecting maternal-young relationships of the nonseparated "rejecting" mothers. Although the specific cause of this effect on the nonseparated mothers is unknown, newborn kids can walk shortly after birth, and the "rejecting" behavior of the nonseparated mothers may have developed when their own kids wandered off and were accepted by the separated "indiscriminate" mothers.

Thus separation of some of these gregarious animals had influenced the social structure of the herd as a whole, changing the behavior of "control" animals whose early postpartum experiences had not deliberately been disrupted, but whose environment had been affected in turn by abnormal maternal and filial behavior produced in the experimental group.

The variations and subtleties of response in this animal population highlight the complexity of the process; it is understandable that studies of human mother-infant relationships are difficult because of the many variables, past and present, which influence the relationship. The social and

cultural factors are infinitely more complex for man than for the goat—yet they are not unimportant for the goat, as we have seen.

C. Spasmus nutans. Another syndrome which we associated with some degree of maternal deprivation is that of spasmus nutans or head nodding associated with nystagmus. This syndrome seems to have been more prevalent in the early part of this century. In the infants we have studied, some degree of maternal deprivation has been noted. The long-held notion that these infants have also been reared in a somewhat darkened environment seems to be borne out by our studies. Perhaps improved lighting and housing conditions account for the decline in incidence of this disorder. Since it usually comes on after the third month, we believe that deprivation and exposure to dim light during the period when the baby is beginning to visually identify his love object are in some way responsible. The impact of experience on central nervous system function so early in life should provide an excellent model for psychosomatic study.

Disturbances in Parent-Infant Relationships

Another group of disorders noted in infants are not specifically related to deprivation *per se*, but rather to some disturbances in the parent-infant relationship. We are not as yet in a position to formulate the disturbed relationships in specific terms for specific syndromes. More detailed studies are in order.

These disorders group themselves under two headings: those associated with disturbances of autonomic function and those associated with disorders of body motility or rhythmic patterns (table I). The two are not mutually exclusive. As we shall see, disorders in both areas may occur.

Because of time limitations, I would like to consider only one syndrome which has been of considerable interest to us as it has been to Dr. Lourie. It is important to note that there has been almost no mention of this disorder—rumination—in the American literature in recent years with the exception of the publication by Lourie.[19] The syndrome of rumination consists of regurgitation of food, some motions which simulate rechewing of it, and reswallowing. Because this simulates what takes place in ruminant animals it has been designated "rumination". In contrast to animals, however, this is a very unphysiologic process, since much food is lost and these infants ultimately become emaciated and expire if the process is not interrupted.

In this group we have also observed significant family, social and psychological problems. We have observed striking immaturity and considerable fear concerning death in the infant of these mothers. In each instance there have been serious marital problems, undoubtedly a reflection in part of immaturity of the mothers. Perhaps the same degree of immaturity pre-

vails in the fathers although we have not had as much opportunity to study them.

It is interesting to observe that these infants also manifest other symptoms of a rhythmic nature. These problems will be considered in more detail later but it is well to point out at this time that psychopathology even in this age period does not result in singular symptoms. Thus these infants showed a wide variety of disturbances in body motility. One of these children manifested body rocking, head rolling and banging, autistic pulling at his hair, and masturbatory activity.

It is our feeling that when the communication process with the mother is inadequate quantitatively or unsatisfactory qualitatively, the infant tends to provide from *within* stimuli which should be coming from *without*. These infants have not been completely deprived infants and perhaps rumination develops because the greatest source of earlier gratification has been in the feeding process. With the growth of the infant and the development of visual maturity to the point of recognizing the love object (mother), it would seem that lack of contact or gratification causes the infant to attempt to *recreate* gratifying experiences for himself. Thus he relates to his body as an object to a greater extent than he does to a maternal figure as a love object. As with all neurotic manifestations the symptom becomes self-destructive with time unless therapeutic relationships are introduced. Thus far we have been successful in interrupting this cycle by brief hospitalization of the infant and the provision of stimulating, comfortable experiences with one nurse. In the interim we have worked with the family sufficiently for them to carry on more adequately in their care of the infant following the baby's discharge from the hospital. Although this perhaps does not provide sufficient psychological orientation for the mother to effect major change, it does seem to provide enough support to permit her caring for the baby more adequately. None of these children has resumed ruminating on discharge from the hospital.

The disordered body motility in these children is of interest. Again Lourie[20] has noted the frequency of rhythmic body movements when he noted that 15 to 20 per cent of children in an unselected clinic population had these manifestations. We are interested in this problem and in our experience this figure would be higher if one observes children over a period of time. Although many speculations concerning the origins of these movements have been proposed in the past, it is our feeling that these constitute one phase of the infant's development of a relationship to his body. When the growth process is too difficult, either because of deprivation or trauma, he relies to a great extent on manipulation of his body for gratification. Thus, these manifestations may be viewed in positive developmental terms, or as pathology, depending upon the extent or the circumstances. Szasz[21] has recently pointed out that in our preoccupation with the development

of object relationships by the infant with people about him, we have neglected the development of his relationship with his body as an object. He states, "Theoretically, I would suggest that we look upon these interrelations between developing body functions and the ego as a process of mastery of the ego over the body (as an object), or to put it more generally, as the evolution of a progressively more complex ego-body integration."

Currently pediatric practice consists largely of parents seeking help for the rearing of their children.[22] The Study of Child Health of the American Academy of Pediatrics[23] indicated that 54 per cent of the pediatrician's time is spent in well child care. With advances in medical knowledge this figure is destined to rise.

The pediatrician is interested, therefore, in studies which will aid him in guiding psychological growth. If we visualize the developing personality of the child as an outgrowth of the interaction of parents with their unique cultural, social, and psychological backgrounds upon the infant with his unique biological characteristics in an ever changing environment, we gain some appreciation of the difficulties in isolating variables for study. The pediatrician and other child-care workers can influence the direction of development, but it is primarily determined by the interaction of parents—or parent substitutes—and the infant.

In spite of our everyday contact with the transactions between mother and baby, we have yet to develop a scientific language for identifying what transpires. This is not entirely unique to parent-infant interaction; investigators interested in studying the transactions of the psychotherapeutic process—particularly the nonverbal aspects—experience a somewhat similar difficulty.

In spite of these difficulties, research into this interaction is going on. The use of motion picture film to help define this process may be helpful. We as well as others are employing such techniques. The methodologic advances in the social sciences are providing additional means for investigation. The observation of children over a period of years will be necessary to evaluate the significance of early experiences for later development.

All of this is not meant to minimize the current role of the pediatrician and other child-care workers. By his provision of adequate physical care, his helping parents to achieve continuity, consistency and respect for individual differences in the rearing of their children, the pediatrician relieves the anxiety of parents and increases their effectiveness. Our current knowledge does not justify a doctrinaire approach to child rearing—whether in the direction of permissiveness or rigidity. For we must keep in mind that the body of practice which has emerged has by and large not yet been validated. A flexible approach to child rearing—particularly avoiding the superimposition of our personal bias upon our patients—is indicated.

Much has transpired since the days when Dr. Wall took up the practice of

pediatrics. We have observed the striking decline in morbidity and mortality from the infectious, metabolic, and nutritional disorders among our children. This was made possible by the better understanding of these disorders as a consequence of research.

Our challenge is to foster comparable developments in psychological growth and development. Just as our advances in controlling physical disorders depended upon collaboration with biochemists, physiologists, microbiologists, pharmacologists and pathologists, advances in the field of mental health will emerge from collaboration with our colleagues in the social and behavioral sciences.

Dr. Wall and his generation of pediatricians left us with a rich heritage in fostering improvement in the health of children. As we strive toward comparable advances in fostering mental health we must incorporate this heritage with our development of new approaches. Thus while continuing our interest in the biological problems of pediatrics we can expand our horizons to include new interests and developments. By so doing we carry on in the tradition of Dr. Wall and the pioneers in American pediatrics who were always ready to move on to the next problem in the interest of children and their parents.

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Visual Problems in the Preschool Child

Nicholas G. Pistolas, M.D.*

Although pediatricians are much more vision or sight conscious than were pediatricians in previous times, the early detection of eye diseases can and should be improved. At the present time, school examinations of the eyes, limited as they are, form a good basis for an evaluation of the eyes. It is even more important, however, for the preschool child ranging in age from birth to five years of age to have a complete eye examination, since the early detection and correction of many eye problems are as valuable as the other preventive medicine measures employed in the early years of life. It is not difficult to conclude that many of the eye problems encountered in the young age group will be first suspected and detected by an alert pediatrician.

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What are some of the common eye problems that we see in the preschool age group? One of the most common is strabismus or squint, in which the eye may deviate either inwardly or outwardly. There are vertical deviations as well, but these are not as obvious on casual observation. It is very important to recognize squints as early as possible, before the child develops visual reflex patterns which are harmful. The longer abnormal patterns remain, the more difficult they are to treat adequately enough to get good functional results.

When should the child be sent to the ophthalmologist if the eyes do not appear to be focusing? An infant can normally see and fix on a light anytime from two to four weeks of age. He may not have smooth movements following the light for the first three or four months of life, but if by the fifth or sixth month of life he does not have good following movements and the light reflexes from his eyes do not appear to be reflected from the eyes in the same spot, that particular child should be examined more carefully. Every child by the age of 6 months of age should follow light in a smooth manner with normal extraocular movements and normal visual alignment. A careful visual examination at this time can be of utmost importance to the future vision of the child.

One type of visual reflex pattern to be avoided in the child with a squint is suppression amblyopia. This occurs in the individual with strabismus who suppresses one eye in order to relieve himself of visual confusion and/or diplopia. This suppression is an involuntary cortical act. With the passage of time an individual who suppresses one eye will begin to lose vision in that eye due to lack of use.

During the war, some surprising discoveries were made in young G.I.'s who had suppression amblyopia during their entire lives and who had the unfortunate experience of losing the good eye by a bullet wound. Mother Nature was kind enough to reawaken the suppressed eye which had previously been thought could never be used again. It is true that such an amblyopic eye can never be used again as long as it is being used in a yoke manner with another eye which is usable. The better eye will always be used, but in the case of loss of the good eye, the suppressed eye can be reawakened.

Another reflex pattern to be avoided in strabismus is a condition called abnormal retinal correspondence. Normally when light falls on one particular spot on the retina, it is recorded in the corresponding area of the cortex and is evidence that the light came from a certain direction out in space. The sight of both eyes is built up in the same manner, so that when eyes are looking in parallel lines or on the same visual axis, light which falls on one spot on the retina of one eye falls on the equivalent spot on the retina of the other eye; a stimulus is therefore sent to the brain saying

that the object in space came from a particular direction. This is normal retinal correspondence. Some individuals who develop strabismus or who would ordinarily compensate by suppressing one eye in order to see clearly, instead of suppressing the eye, by a peculiar quirk of nature continue to use it. The visual light that now comes in on this axis strikes a different spot on the retina. The retina then develops a new line of direction. Is there anything wrong with this? There are several considerations to be taken into account. One is cosmetic; no one desires to have one eye crossing or one eye deviating outwardly with the other eye perfectly straight. Secondly, even though the eye has developed a new line of direction and even though the individual does not have suppression, this eye cannot have perfect vision, since the light rays are not falling on the macula. Therefore, such an eye may only have 20/50 or 20/70 vision. If the other eye has 20/20 or 20/30 correctable vision, an imbalance in vision capable of causing many symptoms will arise. In addition, fusion will be very poor.

Premature infants have many eye problems exclusive of the now less frequently encountered retrolental fibroplasia. Myopia is one of the most frequent findings common to prematures. It is not known exactly why premature infants have a higher incidence and degree of myopia than normal full term infants. It may be due to speeding up of growth of a retina which is trying to catch up in development since it now is getting visual stimulation. Whatever the cause, it is important to diagnose this myopia early and correct it with proper lenses. Strabismus also has a higher affinity for the premature. Again a precise explanation for this is lacking.

Cataracts are also very prone to occur in the premature. As a rule, these are evident in ordinary light, but not all cataracts are that easily visualized. Congenital cataracts in the peripheral rim of both lenses may occur. Since it is not necessary to use the peripheral rims to have good vision, no surgery is indicated for this type. Another eye disease commonly found in the premature, and one infrequently suspected, is glaucoma. Here again, an adequate etiology is lacking. The more common type of glaucoma is probably caused by the immature angle occurring in prematures, which leads to an improper draining of aqueous humor and an increased intraocular pressure.

Tumors do occur in the preschool child and such tumors can be very dangerous. One such tumor is the retinoblastoma. This is one good reason for performing a routine ophthalmoscopic examination on the young child, since when the retinoblastoma is evident enough be be diagnosed during a cursory eye examination it is in a far advanced stage. By then the tumor occupies about a third of the intraocular space and is endangering life. Other tumors which are encountered within this age group are teratomas, dermoids, and phacomatoses, examples of which are the Sturge-Weber syn-

drome and von Hippel's disease. These latter two are vascular abnormalities which may not give any evidence of their existence on the skin but will definitely present as retinal aneurysms in the eye.

Hereditary eye diseases are not uncommon; the chief service the ophthalmologist can render the family of a child with one of these diseases is to acquaint the parents with what to expect in future offspring and succeeding generations.

The most important visual abnormality in this age group is refractive errors. These are almost impossible to diagnose in the preschool child except by a complete ophthalmological examination unless the child has such a large refractive error that it is obvious to all. Certainly the child with a refractive error should be helped and his eyes corrected as early in life as possible. Here again is the importance of a preschool eye examination. In addition, it should be emphasized that not only is it important from the purely functional point of view to detect and correct visual and other eye problems early but also to avoid or minimize the emotional problems frequently present. It is not uncommon to see a child's personality change markedly for the better after a visual problem is properly corrected.

Portography: a Preliminary Report of a New Technique via the Umbilical Vein

Octavio Gonzalez Carbalhaes, M.D.*

For a long time, it has been the hope of surgeons as well as internists to find an easy procedure for visualizing the portal system. Of the procedures available at the present time, the first requires a laparotomy. In this procedure a direct visualization of the portal system and direct reading of the portal pressure is performed. A second method recently introduced to the medical profession, splenoportography, utilizes a potentially dangerous technique and involves the correct localization of the spleen, the position of which is not always constant. There is also danger of uncontrollable bleeding from the splenic puncture site, at times severe enough to require splenectomy.

The technique which is described in this paper is developed on the following basis: The umbilical vein is a vascular structure which extends from

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the umbilicus to the left portal vein. During fetal life its function is to carry oxygenated blood from the placenta to the fetal circulation via the portal system and the ductus venosus. Shortly after birth, it is generally believed that the umbilical vein becomes obliterated. Recent studies by myself have revealed the patency of the umbilical vein over at least two-thirds of its distance proximal to the liver in 50 postmortem and 10 *in vivo* examinations performed, in children as well as in adults.

Segall,[1] in 1923, in his experimental anatomical investigations of the blood and bile channels of the liver, mentions the patency of the umbilical vein in 35 per cent of his postmortem studies. In the same year, Sidbury[2] first used the umbilical vein for transfusions in infants by inserting a needle into the extra-abdominal portion of the vein. Butler,[3] in 1954, in studying the postnatal changes in the intra-abdominal umbilical vein, states, "Soon after birth, the intra-abdominal vein undergoes partial contraction, and its lumen is reduced by about one-half. Subsequent anatomical obliteration is incomplete, and a tiny residuum of the original lumen persists at the hepatic end of the ligamentum teres. Anatomical obliteration is a combination of a) subintimal proliferation, b) the formation and subsequent shrinkage of the coarse collagen fibers in the fibromuscular media, and c) side-to-side flattening of the vein. Thrombosis and subsequent clot-organization play no part in the obliterative process under normal conditions. The elastic fibers of the venous intima persist in the center of the ligamentum teres up to the sixth and seventh decades."

This present paper is part of a larger projected study of children and adults to demonstrate the value of the umbilical vein in the diagnosis of pathology of both the liver and the portal system and organs drained by it, to study direct readings of the portal pressure, and to perform chemical and enzymatic determinations of prehepatic blood; other potential uses include the introduction of chemotherapeutic agents in cancer of the liver and in other liver diseases, and the surgical use of the umbilical vein in blood vessel transplants and grafts, and portocaval and other shunts.

Technique: Through a small midline incision, midway from the umbilicus to the xyphoid process, the skin, subcutaneous fat and fascia are cut. The round ligament, or ligamentum teres, is exposed extraperitoneally at a short distance to the right of the midline. A transverse cut is made through three-fourths of its diameter, after which its lumen (umbilical vein) may then be frequently visualized. If not, with gentle probing at its approximate site, the lumen can always be stretched and fully visualized. With the use of a hemostat, the opening can sometimes be easily stretched up to 1.0 to 1.5 cm. in diameter. Once the lumen is identified, the probe is carefully introduced into the full length of the round ligament. A sudden release of the resistance is encountered when the left portal vein is reached.

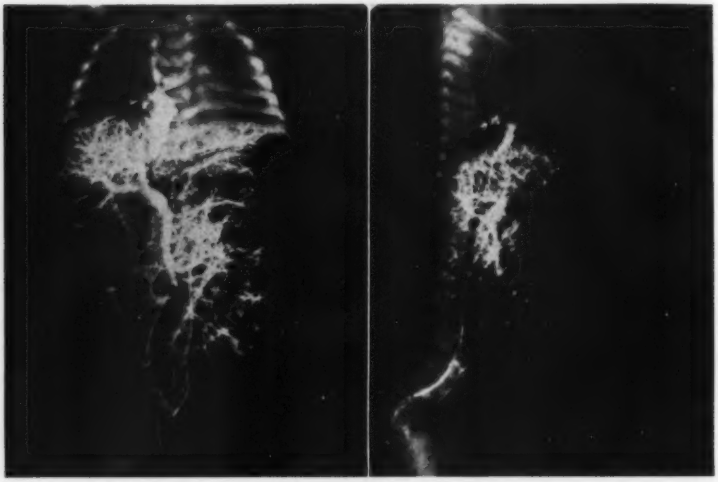

FIG. 1. AP and lateral roentgenograms of the cadaver of a 4 week old infant. Barium sulfate was injected into the umbilical vein. Note complete visualization of the entire portal system.

This may also be accompanied by a reflux of venous blood when removing the probe. A polyethylene tube is then introduced through the umbilical vein into the left portal vein. A ligature is placed proximally and distally to the sectioned area of the ligamentum teres, and the contrast medium is injected.

Visualization of the entire portal system, including a hepatogram, as a result of injecting 30 cc. of a 50 per cent barium sulfate solution into the umbilical vein of the cadaver of a 4 week old infant is shown in figure 1.

This technique has been repeated in three dead infants and in six dead adults in several of whom the contrast medium Hypaque® (50 per cent and 90 per cent), was used with similar satisfactory results. Studies are now in progress to demonstrate the clinical value of such a procedure *in vivo*.

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Clinical Brief: Congenital Urethral Valves

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Congenital urethral obstruction is found almost exclusively in boys. The more common lesion is obstruction due to stenosis of the external urethral meatus. First in importance and second in frequency as an obstructive factor are congenital valves in the posterior urethra.

Congenital urethral valves are membranous, finlike projections in the posterior or prostatic urethra. They are usually attached at one end to the verumontanum which is characteristically enlarged to three to four times its normal size, and elongated. The valves may be unilateral, and thus not obstruct. They may also be on the urethral roof although the usual location is on the floor.

These valves, folds, or membranes, assume one of four possible configurations. In the first, the verumontanum is hypertrophic and elongated with an extended anterior portion which divides into two alae, each of which passes anterolaterally to the wall of the urethra. The second type is the reverse of the first, the folds passing proximally towards the vesical neck. The third form comprises a number of structurally different valves. The common denominator of these is the lack of relationship of the valve to the verumontanum. They may be found in any portion of the posterior urethra, anterior or posterior to the verumontanum and contacting the urethra in its entire circumference. The central orifice may vary in size from a fraction of a millimeter to several millimeters in diameter. The fourth type represents combinations and permutations of the first three.

The structure of the valve is such that it always balloons outwardly, readily permitting the passage of an instrument or catheter, but usually offering resistance to the outflow of urine. Histologically the valve shows normal urethral mucosa covering a wall of connective tissue of varying thickness.

A number of theories regarding the etiology of these structures is extant. Briefly, they are: 1) persistence of the urogenital membrane; 2) attachment or fusion of the colliculus to the posterior urethral roof; 3) enlargement of ridges normally present; or 4) anomalous development of Wolffian and Müllerian ducts.

Clinically, one finds slow, dribbling urination with straining, much as that seen in the older man with prostatism, as well as difficulty initiating urination, decreased force of the urinary stream, enuresis, dysuria, fre-

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quency, and abdominal distention. Later signs and symptoms are attributable to failing renal function and associated uremia, with anorexia, nausea, vomiting, headache, listlessness, weight loss, coma and ultimately, death.

Urethral valves will be an occasional finding in boys presenting with urinary difficulty, pyuria, or even enuresis Symptoms may, however, not become distressing until the advent of infection. Patients may thus pass a decade or two before seeking medical advice and at such a point be found in some stage of renal failure.

The mechanical effects of bladder neck obstruction are well known. Dilation of the posterior urethra, hypertrophy and trabeculation of the bladder wall, diverticulum formation, bladder atony, ureteral elongation, hydroureter, hydronephrosis, and pyonephrosis may result.

The diagnosis is made clinically on the basis of presenting signs and symptoms. Cystourethroscopy will demonstrate valves satisfactorily. The principal diagnostic difficulty lies in distinguishing valves from normal redundancies of the posterior urethra.

Gradual preoperative decompression of the urinary tract until the patient is stabilized is generally considered of importance in the treatment of this entity. Definitive therapy involves removal of the valves either transurethrally or suprapubically. The transurethral route is favored by most operators.

In summary, urethral valves constitute the second most common form of congenital urethral obstruction. They are found almost exclusively in boys. There are four major types based on their configuration relative to the verumontanum. Etiology is not clear. The main symptoms are those of chronic lower urinary tract obstruction, and dribbling of urine in a young boy with straining should suggest the diagnosis. Late symptoms are those attributable to failing renal function. Diagnosis is established most readily by cystourethroscopy. Gradual decompression of the urinary tract in preparing the patient for surgery may be of importance. Treatment consists of transurethral resection of the valves.

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The Editor's Column

OPHTHALMOLOGICAL SUSPICION OF UNRECOGNIZED CONGENITAL TOXOPLASMOSIS

Toxoplasma gondii are protozoa which reproduce only within a host cell. Proliferation of the organisms is followed by cell destruction and parasitemia. Focal cellular necrosis and inflammatory reaction ensue in various tissues under attack, such as heart, lung, liver, spleen, lymph nodes, brain, retinas and skin. Neutralizing antibodies appear during the first one to three weeks of the disease, and with development of immunity the parasitemia subsides while repair of the cellular necrosis proceeds in the extraneural viscera. As the parasites retreat from their piracy tactics of cellular invasion and destruction they accumulate in large numbers within the membrane of a captured cell, thereby deceptively avoiding antibody detection since the pseudo-cyst elicits no chemotactic response. In this state they survive for the lifetime of the host unless the pseudo-cyst happens to rupture. At some indefinite date after onset of the disease the majority of chronically infected hosts develop an allergy to the products of the parasite. This is manifest by a skin hypersensitivity to toxoplasmin similar to the tuberculin reaction.

Embryonic and fetal neural tissue (brain and retinas) are especially susceptible to severe involvement by these protozoa which are transmitted to the fetus via the placental circulation while the infected mother almost never demonstrates clinical evidence of a neural tissue lesion. If the fetus survives, healed stigmata of the irreparable damage to neural tissue are often apparent. Recognition at birth of the active disease or of these healed neural tissue stigmata, supported by positive serological antibody titers in both infant and mother, allows the presumptive diagnosis of congenital toxoplasmosis. However, the prenatal illness may resemble the usual symptomless acquired adult illness. This raises the question: How often do the mother and fetus share the same unrecognized toxoplasma infection?

A new concept of chorioretinitis in older children and adults reflects the importance of this question. Heretofore, an initial episode of chorioretinitis occurring in an older child or adult associated with positive serological evidence of toxoplasmosis had been attributed to a newly acquired infection. More recently this concept is criticized for the following reasons: 1) Retinal invasion is very rare in acquired toxoplasmosis; 2) although chorioretinitis may not be present at birth in a congenital toxoplasmic infant, it may appear at some later date (a recent study showed only 40 per cent of 75 congenital toxoplasmic infants had chorioretinitis at birth which

increased to 80 per cent when the surviving infants were later examined); and 3) congenital toxoplasmosis probably is often unrecognized.

The new hypothesis is that late ocular toxoplasmosis usually represents an allergic inflammatory response to a ruptured pseudo-cyst which has persisted in the retina from a prenatal infection that was not recognized as congenital toxoplasmosis. The histological picture is in keeping with this hypothesis, and differs in many respects from the predominantly acute necrotic chorioretinitis with abundant intracellular toxoplasma seen in the eyes of fatal congenital cases. It is reasoned that the toxoplasma liberated from the pseudo-cyst remain scattered without being able to invade and multiply within new cells, and are destroyed by antibodies, their products being the allergens which incite the allergic response in the surrounding hypersensitive tissue. This hypothesis is somewhat supported by the fact that so many cases of adult chorioretinitis attributable to toxoplasmosis rapidly reach a peak of inflammation within days and gradually subside over a period of four to six weeks.

M. M. P.

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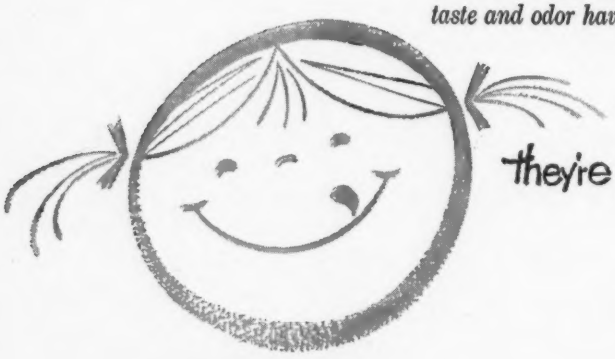
She's eager for vitamin time because the typical B-vitamin taste and odor have been masked.



they're chewable!

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